

REMARKS

Claims 8-10, 14-16, 19-21, 47-52, 54, 55, 57-61, 63 and 64 are in the application for consideration.

Reconsideration of the Examiner's positions is requested in light of the following.

Independent claims 16 and 20 stand rejected over Wolf in view of Ding et al. and the '071 Japanese reference. An English language machine translation of the Japanese reference has been acquired, and submitted herewith in a Supplemental Disclosure Statement. Applicant disagrees with the rejections for at least the following reasons.

First, each of independent claims 16 and 20 recites a volumetric ratio of all fluorocarbon to ammonia of from 40:1 to 20:1. The Ding et al. reference clearly does not teach such. Specifically and clearly, the only meaningful teaching to be drawn from Ding et al. is to **NOT** utilize a ratio above 2.5:1 (col.7, Ins.11-13), and with Ding et al.'s Fig. 3 showing experiments were never even tried at greater than 11:1 flow ratio of fluorocarbon to ammonia. Under no conceivable stretch of the imagination does Ding et al. disclose or suggest using a ratio of from 20:1 to 40:1, and in fact, specifically teaches against doing so.

The Examiner asserts that Applicant's specification teaches operability within the Ding et al. ratio ranges, and that Applicant's claiming outside of the ranges is thereby optimization precluding patentability. However, the focus and analysis are to be directed to Applicant's claims, not what is disclosed, with respect to the patentability determination in light of the art that has been cited.

The fact that Applicant claims an optimization of what it discloses is not material to the obviousness inquiry where the art teaches away from what is claimed as respects 20:1 to 40:1. Operability does not have to hinge/turn upon what Applicant claims when the reference specifically says do not do what Applicant claims. Further, Applicant does not need to demonstrate unexpected results relative to its range where the art specifically teaches away from, and specifically teaches inoperability of, the range which Applicant claims. The Examiner's position in this regard only has merit if one ignores the MPEP requirement that the prior art must be considered in its entirety, including disclosures that teach away from what is claimed. MPEP § 2141.02. In its entirety, Ding et al. clearly teaches away from an etching chemistry having a ratio of all fluorocarbon to ammonia of from 40:1 to 20:1. Each of Applicant's independent claims 16 and 20 should be allowed for this reason alone.

Second, each of Applicant's independent claims 16 and 20 recite that the reactive components in the etching chemistry are consisting of ammonia and at least one fluorocarbon. The Examiner is reminded that this transitional phrase excludes the use of other reactive components pursuant to MPEP § 2111.03. It is recognized that Ding et al.'s Examples 1, 2, and 3 in cols. 11 and 12 apparently don't use a carbon-oxygen containing gas. Yet, the Ding et al. reference teaches the requirement of using a reactive carbon-oxygen component in its etching gas to work outside their very narrowly stated preferred ranges. (See, col.2, Ins.57-59; col.12, Ins.40-45; and col.12, Ins.62-66.) Accordingly, the teaching to a person of skill in the art is that one must also use a carbon-

oxygen gas to have a chance at being operable outside of their most preferred stated ranges. This certainly doesn't teach a person of skill to go way outside of their preferred ranges (i.e., to 20:1 to 40:1 as Applicant claims) without using some carbon-oxygen containing gas. Accordingly, the reference clearly teaches away from restricting the reactive components to ammonia and at least one fluorocarbon, as is required by Applicant's use of "consisting of" pursuant to MPEP § 2111.03. Claims 16 and 20 therefore recite something contrary to the teachings of Ding et al. For at least this additional reason, Applicant's independent claims 16 and 20 should be allowed, and action to that end is requested.

Third, as asserted in Applicant's previous responses, the relied upon Japanese reference specifically teaches against that which Applicant recites. Specifically, the Japanese reference teaches etching both of photoresist and silicon nitride with its state C_5F_8 chemistry, whereby Applicant's claims 16 and 20 clearly recite etching silicon nitride selectively to photoresist. Accordingly, the cited Japanese reference specifically teaches against Applicant's claim 16 and 20 with respect to any fluorocarbon. Further, the reference's teaching of etching photoresist teaches against its combination with a reference (Ding et al.) that teaches not etching photoresist. The combination of Ding et al. with the Japanese reference renders each reference unsatisfactory for its intended purposes as respects etching action relative to photoresist in violation of MPEP § 2143.01. Accordingly for at least this additional reason, the rejection of

independent claims 16 and 20 are improper and should be withdrawn. Claim 20 should additionally be allowed for its specific recitation of C₅F₈.

The "general conditions" of Applicant's independent claims 16 and 20 are not disclosed in the prior art, and Applicant claims more than mere optimization. The Examiner's positions would have merit only if Ding et al. tried at some ratio higher than 12:1, had data for etching silicon nitride instead of silicon oxide¹, and the Japanese reference wasn't etching photoresist.

Applicant's dependent claims should be allowed as depending from allowable base claims, and for their own recited features which are neither shown nor suggested in the cited art. For example, and by way of example only, the references aren't seen to suggest an etching chemistry comprising at least three fluorocarbons. All of Applicant's dependent claims should be allowed. Action to that end is requested.

¹ While Ding et al. allege operability with films that include a "nitride" (col.4, ln.11), their reported data in Examples 1-4 and Fig. 3 is with respect to etching silicon oxides, not silicon nitride. Further, they give TiN as an exemplary nitride that can be etched with their method (col.4, ln.12). Yet, later they state they achieved greater than 30:1 selectivity to TiN (essentially meaning they did not etch it) in Example 3 (col.12, lns.13-17.). Accordingly, nothing is taught regarding nitrides generally, and certainly not with respect to silicon nitride in particular.

This application is believed to be in immediate condition for allowance,
and action to that end is requested.

Respectfully submitted,

Dated: 7-23-03

By: 
Mark S. Matkin
Reg. No. 32,268